08/876,414

```
    (FILE 'USPAT' ENTERED AT 12:06:17 ON 19 JUL 1998)
L1          481 S SEMICONDUCTOR DOP###
L2         3181 S ENERGY PULSE
L3         4976 S LASER PULSE
L4            1 S L1 AND L2
L5           15 S L1 AND L3
L6           16 S (L4 OR L5)
L7       697069 S RATE
L8           14 S L6 AND L7
```

=> d cit ab l8 1-

1. 5,606,163, Feb. 25, 1997, All-optical, rapid readout, fiber-coupled thermoluminescent dosimeter system; Alan L. Huston, et al., 250/337, 484.3, 484.5 [IMAGE AVAILABLE]

US PAT NO: 5,606,163 [IMAGE AVAILABLE] L8: 1 of 14

ABSTRACT:
A thermoluminescent radiation dosimeter system for the remote monitoring ofadiation sources. The system includes a radiation-sensitive thermoluminescent dosimeter which utilizes a new, **semiconductor-doped** glass material disposed at a remote location for storing energy from ionizing radiation when exposed thereto and for releasing the stored energy in the form of thermoluminescence light at a first wavelength when stimulated by exposure to light energy at a predetermined stimulating second wavelength. The system further includes: an optical source for providing stimulating light energy at the predetermined stimulating second wavelength; a thermoluminescent detector for measuring thermoluminescent emissions; and an optical fiber for passing the predetermined stimulating light energy from the optical source to the thermoluminescent dosimeter to stimulate the thermoluminescent dosimeter to produce thermoluminescence light from stored energy and for passing the thermoluminescence light to the thermoluminescent detector to enable the thermoluminescent detector to measure any thermoluminescent emissions occuring when the thermoluminescent dosimeter is heated by the light energy at the predetermined stimulating second wavelength.

2. 5,548,433, Aug. 20, 1996, Optical clock recovery; Kevin Smith, 359/158, 179, 188, 341, 349; 372/18, 26, 28, 32 [IMAGE AVAILABLE]

US PAT NO: 5,548,433 [IMAGE AVAILABLE] L8: 2 of 14

ABSTRACT:

A system for recovering a clock from an optically encoded signal uses a mode-locked laser. A modulator is connected in common with the laser cavity of the laser and a transmission path applies the input optically encoded signal to the modulator. The modulator in response to the optically encoded signal modulates the phase and/or amplitude of light in the laser cavity thereby locking the phase and frequency of an output pulse stream to the timing wave of the optically encoded signal. In a preferred example, the modulator is a non-linear optical modulator used for cross-phase modulation (XPM) of the light in the laser cavity.

3. 5,493,628, Feb. 20, 1996, High density optically encoded information storage using second harmonic generation in silicate glasses; Nabil M. Lawandy, 385/122; 346/107.1; 359/7, 326, 328; 385/141 [IMAGE AVAILABLE]

US PAT NO: 5,493,628 [IMAGE AVAILABLE] L8: 3 of 14

ABSTRACT:
Multiple bits of information are stored in the frequency domain in a bulk glass using optically encoded .chi..sup.(2) gratings. The information is read out by measuring a second harmonic generation (SHG) from the encoded glass as a function of wavelength. Information storage densities in excess of 10.sup.8 bits/cm.sup.2 are readily achievable. The stored information is stable under readout conditions, and the information can

be erased and rewritten.

4. 5,420,845, May 30, 1995, Methods of varying optical properties, optical devices, information recording media and information recording methods and apparatuses; Yoshihito Maeda, et al., 369/100; 346/135.1; 369/275.1, 284, 288; 430/270.12, 945 [IMAGE AVAILABLE]

US PAT NO: 5,420,845 [IMAGE AVAILABLE] L8: 4 of 14

ABSTRACT:
High density optical information recording even at room temperature is achieved by control of the diameter of crystalline portions exhibiting quantum size effects of fine semiconductor particles distributed in a dielectric matrix, using the non-crystalline to crystalline phase transition of the fine particles. The quantum size effects mean that the optical properties of the medium depend on the diameter of the crystalline portions. Various methods of recording, reproducing and erasing information using this optical recording medium are possible. The invention is applicable to other optical devices.

5. 5,394,413, Feb. 28, 1995, Passively Q-switched picosecond microlaser; John J. Zayhowski, 372/10, 11, 21, 22 [IMAGE AVAILABLE]

US PAT NO: 5,394,413 [IMAGE AVAILABLE] L8: 5 of 14

ABSTRACT:
An apparatus and method for a passively Q-switched microlaser for producing high-peak-power pulses of light of extremely short duration are disclosed. The apparatus comprises a gain medium and saturable absorber disposed within a laser cavity. When the cavity is pumped, the saturable absorber prevents the onset of lasing until the inversion density within the cavity reaches a critical value. The length of the cavity, the material parameters, and the reflectivities of the mirrors are selected such that pulses of duration less than about 1 ns and of peak power in excess of about 10 kW are obtained. The invention has application in high-precision optical radar, nonlinear optics, micromachining, microsurgery, robotic vision, and other technologies requiring high-peak-power **laser pulses** of extremely short duration.

6. 5,294,289, Mar. 15, 1994, Detection of interfaces with atomic resolution during material processing by optical second harmonic generation; Tony F. Heinz, et al., 216/60; 118/712; 156/345; 216/67, 79; 427/10 [IMAGE AVAILABLE]

US PAT NO: 5,294,289 [IMAGE AVAILABLE] L8: 6 of 14

ABSTRACT:
A technique for observing optical second harmonic generation effect at a surface of a material during processing thereof, particularly in the presence of a plasma, for controlling the processing of the material. A preferred form of the apparatus and method includes a combination of spectral, spatial, polarization and temporal filtering to allow observation of optical second harmonic generation and control of processing of the material with processes such as reactive ion etching to a high degree of resolution.

7. 5,114,876, May 19, 1992, Selective epitaxy using the gild process; Kurt H. Weiner, 117/53, 58; 148/DIG.105, DIG.106; 438/498, 535 [IMAGE AVAILABLE]

US PAT NO: 5,114,876 [IMAGE AVAILABLE] L8: 7 of 14

ABSTRACT:
The present invention comprises a method of selective epitaxy on a semiconductor substrate. The present invention provides a method of

selectively forming high quality, thin GeSi layers in a silicon circuit, and a method for fabricating smaller semiconductor chips with a greater yield (more error free chips) at a lower cost. The method comprises forming an upper layer over a substrate, and depositing a reflectivity mask which is then removed over selected sections. Using a laser to melt the unmasked sections of the upper layer, the semiconductor material in the upper layer is heated and diffused into the substrate semiconductor material. By varying the amount of laser radiation, the epitaxial layer is formed to a controlled depth which may be very thin. When cooled, a single crystal epitaxial layer is formed over the patterned substrate. The present invention provides the ability to selectively grow layers of mixed semiconductors over patterned substrates such as a layer of Ge.sub.x Si.sub.1-x grown over silicon. Such a process may be used to manufacture small transistors that have a narrow base, heavy doping, and high gain. The narrowness allows a faster transistor, and the heavy doping reduces the resistance of the narrow layer. The process does not require high temperature annealing; therefore materials such as aluminum can be used. Furthermore, the process may be used to fabricate diodes that have a high reverse breakdown voltage and a low reverse leakage current.

8. 4,973,122, Nov. 27, 1990, Optical nonlinear cross-coupled interferometer and method utilizing same; David Cotter, et al., 385/50; 250/227.11, 227.19; 307/407, 409; 356/350; 385/1, 122 [IMAGE AVAILABLE]

US PAT NO: 4,973,122 [IMAGE AVAILABLE] L8: 8 of 14

ABSTRACT:

An optical device includes a 50-50 cross-coupler having a pair of ports optically coupled by a waveguide which includes a portion of material having a non-linear refractive index with a relaxation time such that the effect on the non-linear portion of a first pulse passing through the portion last long enough to affect the phase of a second pulse relative to the first. It finds application as a logic element, optical amplifier modulator and the like.

9. 4,749,840, Jun. 7, 1988, Intense laser irradiation using reflective optics; Bernhard Piwczyk, 219/121.68, 121.69, 121.74, 121.76 [IMAGE AVAILABLE]

US PAT NO: 4,749,840 [IMAGE AVAILABLE] L8: 9 of 14

ABSTRACT:
Intense far-ultraviolet laser radiation is applied to a workpiece in performance of processes in the fabrication of integrated circuits, including processes of ablation, deposition, impurity implantation and radiation induced chemical processes. Other processes where intense far-ultraviolet laser radiation is applied include hardening and annealing a workpiece by exposure to the radiation. Particular embodiments of the invention herein enables selective removal of a polymer film on a semiconductor substrate by ablative photodecomposition (APD) using intense far-ultraviolet, or shorter wave length, radiation from a pulsed laser requires focusing the laser radiation to provide sufficiently high fluence of laser light energy to ablate a selected area of the polymer to a useful depth in a reasonable time, sometimes referred to as the threshold of fluence of the **laser pulses** required to produce effective APD of the polymer. This is done with a reflective objective lens system between the laser and the polymer film that focuses the laser beam on a target area of the film surface to a high fluence image of the beam exceeding the threshold for APD. All optical surfaces of the objective lens system are reflective and so are not damaged by the intense radiation as refractive lenses can be. In a preferred embodiment, the reflective objective lens system includes two reflectors, one large concave reflector with an entrance aperture at the center facing the

target and one small centrally-located convex reflector facing away from the target.

10. 4,706,018, Nov. 10, 1987, Noncontact dynamic tester for integrated circuits; Johannes G. Beha, et al., 324/751 [IMAGE AVAILABLE]

US PAT NO: 4,706,018 [IMAGE AVAILABLE] L8: 10 of 14

ABSTRACT:
Testing of integrated circuit process intermediates, such as wafers, dise or chips in various stages of production (test chips) is facilitated by a nonintrusive, noncontact dynamic testing technique, using a pulsed laser, with laser light modification to increase photon energy through conversion to shorter wavelength. The high energy laser light excites electron emissions to pass to the detection system as a composite function of applied light energy and of dynamic operation of the circuit; detecting those emissions by an adjacent detector requires no ohmic contacts or special circuitry on the integrated circuit chip or wafer. Photoelectron energy emitted from a test pad on the test chip is detected as a composite function of the instantaneous input voltage as processed on the test chip, in dynamic operation including improper operation due to fault. The pulse from the laser, as modified through light modification, the parameters of detection of bias voltages, and the distances involved in chip-grid-detector juxtaposition, provides emissions for detection of circuit voltages occurring on the test chip under dynamic conditions simulating actual or stressed operation, with high time resolution of the voltages and their changes on the circuit.

11. 4,593,306, Jun. 3, 1986, Information storage medium and method of recording and retrieving information thereon; D. D. Marchant, et al., 257/617, 448; 365/114 [IMAGE AVAILABLE]

US PAT NO: 4,593,306 [IMAGE AVAILABLE] L8: 11 of 14

ABSTRACT:
Information storage medium comprising a **semiconductor doped** with first and second impurities or dopants. Preferably, one of the impurities is introduced by ion implantation. Conductive electrodes are photolithographically formed on the surface of the medium. Information is recorded on the medium by selectively applying a focused laser beam to discrete regions of the medium surface so as to anneal discrete regions of the medium containing lattice defects introduced by the ion-implanted impurity. Information is retrieved from the storage medium by applying a focused laser beam to annealed and non-annealed regions so as to produce a photovoltaic signal at each region.

12. 4,505,947, Mar. 19, 1985, Method for the deposition of coatings upon substrates utilizing a high pressure, non-local thermal equilibrium arc plasma; Vladimir Vukanovic, et al., 427/452; 204/192.1, 298.41; 219/121.47; 376/916; 427/455, 456, 561, 568 [IMAGE AVAILABLE]

US PAT NO: 4,505,947 [IMAGE AVAILABLE] L8: 12 of 14

ABSTRACT:
A method is provided for the deposition of coatings upon substrates utilizing a high pressure, non-local thermal equilibrium arc plasma including the steps of generating a non-LTE arc plasma at a pressure greater than about 0.1 atmospheres, introducing a coating material into the arc plasma, positioning a substrate material proximate to the arc plasma whereby activated species of said coating material formed by the arc plasma contact the substrate to form a coating.

13. 4,446,557, May 1, 1984, Mode-locked semiconductor laser with tunable external cavity; Luis Figueroa, 372/45, 18, 19, 20, 43, 48, 56, 73 [IMAGE AVAILABLE]

US PAT NO: 4,446[illegible]7 [IMAGE AVAILABLE] [illegible]8: 13 of 14

ABSTRACT:
A mode-locked gallium arsenide crystal laser has a cavity length equal to one-half its principal noise resonance wavelength and an electrode overlying a portion of the crystal, the remaining portion being a self-aligned region diffused or implanted with impurities comprising saturable absorbing centers. An anti-reflective coating is placed on a crystal facet facing an external mirror defining one end of the laser cavity. The resulting laser has improved power, frequency and temporal stability.

14. 4,234,356, Nov. 18, 1980, Dual wavelength optical annealing of materials; David H. Auston, et al., 438/799; 117/54, 904, 934, 936; 148/DIG.3, DIG.90, DIG.92, DIG.93; 219/121.6, 121.66; 250/492.2; 257/617; 438/530, 796 [IMAGE AVAILABLE]

US PAT NO: 4,234,356 [IMAGE AVAILABLE] L8: 14 of 14

ABSTRACT:
A new mode of optical annealing is disclosed wherein two different wavelength pulses are used to anneal a damaged semiconductor substrate. The first pulse may be of relatively weak intensity, but is strongly absorbed by the solid substrate. The second pulse, which is not strongly absorbed by the solid substrate when in the solid phase, is strongly absorbed by the substrate when in the molten phase. Exposure to the first pulse results in the melting of the substrate, which then becomes highly absorptive to light at the wavelength of the second pulse. Readily available laser sources which are generally not highly absorbed by the semiconductor in the solid phase may thus be efficiently utilized.